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FRANCIS HUNTINGTON SNOW, SCIENTIST.

By E. MILLER, Lawrence.

WHEN Oliver Cromwell was sitting for a portrait of himself, he said to the artist, "Paint me as I am." So when one attempts to portray the character and life of another, in order that the picture may be perfect in all its details—nothing added that should be omitted, nothing lacking that should be there—it is easily seen how great a task is to be accomplished. But when the character and the work of such a man as Francis Huntington Snow, whom we all knew and loved, are to be described, the undertaking is a very great one indeed.

To portray him as he lived, as he showed himself in his family and among his fellow citizens; to picture him in his classroom with his students about him, and in his laboratory arranging and classifying the material he had collected among the mountains, on the plains and from the sea, would require in the one attempting it a personal and intimate acquaintance with the man. Nor would the description be complete without the story of his search for new and unknown forms of insect life, or for meteoric bodies; of his exposure to dangers, seen and unseen; of the writing and publishing of his scientific reports; of expeditions made summer after summer; of his daily record of rains and snows, and winds and storms; and of his investigations into the habits of insects in order to save the wheat and corn of Kansas. And over and above all this, there must be shown the indomitable spirit, the intensity of purpose and the unflagging zeal, as well as the great mental and moral qualities, that in themselves constituted the man.

From the day of his birth, in 1840, until he entered Williams College, in 1858, the boy Frank Snow exhibited the same determined, masterful spirit and honorable ambition to win out, the same hatred of shams, and that rugged, vigorous, incorruptible and outspoken sense of honor that ever marked his long and useful career of service. At the age of eighteen he entered college, where for four years the boy gave proof of the stuff that was in him. He seemed to be always keyed up for work or play. And this told in unmistakable terms what kind of man was being fashioned during those four years at college. His thorough mastery of the old classic languages, his clear conception of such scientific subjects as were in the course of study of those days, and his eagerness in the acquisition of philosophy, history and mathematics, proved how conscientiously and carefully he applied himself to everything he undertook. Outdoor life was to him a constant source of enjoyment. He fairly reveled in the pure air about him. He was a lover of physical exercise, and entered into the sports and games of the athletic field of those days with jaws set and muscles hard and tense, and whether defeat or victory came to him, he accepted either as a gentleman. There was nothing small, nothing mean, about him.

When he graduated he stood at the head of his class and was appointed valedictorian by the faculty. To win such an honor, when among his classmates were General Armstrong, Franklin Carter (afterwards president of Williams College), Prof. E. H. Griffin (of Johns Hopkins University), Prof. George Raymond (of Princeton University), and other notable men, was a great achievement for a boy of twenty-two. His standing as a scholar was at that time the highest ever reached by a student of Williams. All these accomplishments, successes and victories were not obtained by sudden fits of inspiration, but by honest, earnest work, day after day.

When F. H. Snow entered college he was a boy; when he graduated, four years later, he was still a boy; and during the remaining forty-six years of his life he continued to be a boy—the same happy, joyous and free-hearted fellow, year after year.

In 1864 the young man entered Andover Theological Seminary to study for the ministry. He took this step very much against the wishes of his father, who was anxious that his son should be a partner with him in business. To the seminary, however, he went, and during his course there he was often invited to preach in the churches of the neighboring towns. His preaching met with great acceptance, and at last a call came to him to be pastor of the Congregational church at Concord. After the trial sermon, his father, who was in the audience, the most interested man there, was so overcome by his feelings that he kissed his son. From that moment all opposition on the part of his father disappeard. Young Snow, studying theology at Andover, was intensely aroused by the War of the Rebellion, and, fired with a patriotic desire to serve his country, became a worker in the United States Christian Commission, and was assigned to duty at the front upon the battle-fields between Washington and Richmond. Here, as usual, he was ever ready to do his duty. In the hospital, on the field of battle, and everywhere, Snow was to be seen, ministering to the sick, wounded and dying; speaking words of comfort; writing letters for the helpless soldiers, and treating all alike, white or black, unionist or rebel, with tenderness and sympathy.

During his connection with the Christian Commission the young man kept a diary. The following entry, dated March 31, 1865, was made: "I went to the front to-day when a sharp battle was raging—the battle of Stony Creek—where our loss was about 1000 killed and wounded. The Fifth corps was repulsed and obliged to fall back during the forenoon to the south side of the creek. In the afternoon, however, it recovered the lost ground. The dead and wounded of both sides fell into our hands and presented a sad scene. Men lay on the ground stiff in death, their unclosed eyes turned upward in vacant stare, and their stiffened hands and arms raised toward heaven as if in supplication to God. And O what agony was depicted on the faces of some of our wounded boys. It was an inestimable boon to be allowed to moisten their parched lips with a little cold water from the spring near by, or to note down a few words of farewell from some dying boy to his beloved mother. Surely, man pays a terrible price for indulgence in crime, and no nation ever paid more dearly for its wickedness than our own American people for the enormity of chattel slavery."

Here is another extract: "After the surrender of Lee, I and others this morning effected an entrance through the rebel lines, in order to do which we were obliged to flank the guards. We found ourselves among defiant rebels. All the officers and many of the privates expressed the rankest treason with unlimited boldness. They would fight us again if General Lee would only say the word. They were not whipped but only overpowered; would leave the country unless they could achieve their independence. The South would never submit so long as they could keep an organized force of 5000 men; would turn guerrillas as soon as the main armies had surrendered, and harass the United States into recognition of their independence."

Again: "After a long discussion with Sergeant Gray, of the Seventh Louisiana, in regard to the cause of the war, I finally suggested that after all we had better shake hands and be friends again, letting bygones be bygones, when he immediately straightened his athletic form and with a flood of indignation in his eye, replied: 'Shake hands with you? Never will I shake hands with the man who has shed the life-blood of my dearest friends. Let bygones be bygones? That I will; all friendship with you shall be a bygone forever.'"

On Sunday, April 9, 1865, he wrote as follows: "The most brilliant page in the military history of our nation has been written to-day in characters that shall never be effaced. The Rebel Napoleon has surrendered to the Wellington Grant, and the rebellion is virtually brought to a close. The enthusiasm of our troops knows no bounds. The air is filled with the sound of glad huzzas as the great news spreads like wildfire from regiment to regiment. All along the lines hundreds of military bands are discoursing martial music, and naught seems lacking to complete the happiness of all."

His work in the army was now over. He laid aside his career as a minister of the gospel and accepted a call from the University of Kansas to occupy a chair in that new institution of learning. The call was made mainly through the influence of Gov. Charles Robinson. Had he been at liberty to choose, he would have taken the chair of the ancient languages, for his training, his tastes and his power of memory fitted him for that kind of work. But the professor cheerfully turned aside from Homer and Plato, and Horace and Cicero, to teach mathematics, geography, natural philosophy, and any other science that might show itself in an embryonic school of fifty-five students in its first year of existence. Little did he dream, and never did his most intimate friends in their wildest imaginings ever think, that in him was the stuff for the making of a great scientific thinker, who was to turn over new pages of science and widen the boundaries of knowledge. What he might have done, how much of the life of ancient Greece and Rome he might have brought to light through persistent research, and what additions he might have made to general literature, no one can tell. A new world and a newer field of knowledge were for forty-two years to be explored by him and the results given to science.

Williams College never did a better thing than when she gave Snow to Kansas, and Kansas never did a greater thing than when she welcomed to her citizenship so great a thinker.

What was it that this man did during the forty-two years of his connection with the University of Kansas? Every Kansan knows the story by heart. Twenty thousand young men and women with one accord testify every day of their lives as to the value of the great institution on Mount Oread, a monument to the genius and guiding hand of this master builder. They know that he was a splendid type of the highest class of educators. Beginning with mathematics of a very elementary kind, and with natural science in its infancy in the University, he moved forward, introducing into the curriculum, one after another, entomology, meteorology, zoölogy, botany, biology and other kindred subjects; cordially supporting the idea of building into a great school the various departments of civil, mechanical, hydraulic, mining and electrical engineering; assisting in the evolution of a department of chemistry that now ranks among the best of its kind. Soon it was noised abroad that right here on Kansas soil, where only forty-three years before some of the best blood of the land was shed for the sake of liberty, here a great scientific and technical school had sprung into existence. During all this time, the man who was so quietly doing things was at work training a half dozen or more young men who were soon to be heard and talked about all over the scientific world. They are in the University to-day. Two more are in Leland Stanford Junior University, and others still are scattered over the country at work in different departments of science. Governors of states, judges, congressmen, professors of colleges and universities, lawyers, bankers, engineers and farmers have sat at the feet of this wonderful man, learning of him.

In the year 1890 Professor Snow, then a doctor of philosophy and a doctor of laws, was elected chancellor of the University. This act of the board of regents met the hearty approval of the people of the state, and also that of the faculty and the student body. The wisdom of the choice was seen at once in the forward steps taken by the University in all of its relations. It was at this time that an insect known as the chinch-bug was doing immense damage to the fields of wheat and corn of Kansas and of neighboring states. How to prevent the impending ruin was the question uppermost in the minds of men all over the infected districts. Relief came just as despair was settling down upon the farmer. Help was extended from a quarter from which such help is seldom expected. Chancellor Snow obtained a fungus growth which by a process of inoculation was communicated to the living bug. It was found that the fungus growth would spread from bug to bug very rapidly, quickly destroying the pest in the grain-fields in a most thorough manner. The state legislature granted a liberal sum for the purpose of carrying on the process of inoculating bugs under the direction of Doctor Snow, thus placing their seal of approval upon what he was doing. His honest efforts in this direction gained for him the confidence and love of every farmer and almost every citizen of the state. In the museum of natural history of the University the record of a busy life is to be found—the story of a marvelous career.

In the summer of 1907 Dr. Snow conducted his twenty-sixth and final expedition for the collection of insects among the mountains of Arizona. He returned with more than 12,000 specimens. His first expedition was undertaken in 1872. Generally he had with him members of his own family, students and young scientists, with whom explorations were made in Kansas, Colorado, Texas, New Mexico, Arizona and other sections of the country. In a few years large quantities of plants, insects, mammals, birds, fossils and meteorites were placed in the museums of the University, worth many thousands of dollars and of great scientific value. At the present time the entomological collection contains over 21,000 species and 275,000 specimens of insects, the largest collection in the United States. The entomological expedition of 1903, in southwestern Arizona, brought back nearly 25,000 specimens, and of these there were from 50 to 100 new species. In this collection there were 5430 beetles; 4500 flies; 1926 butterflies and moths; 11,822 bees and wasps; 550 grasshoppers and crickets; 232 bugs; 169 dragon-flies; in all 24,629. It was on this trip that the provisions of the party ran rather low. Flour was about the only thing left when they began to return. Of potatoes there were none for some time, and of butter they were destitute for a month. In relating-their experiences, Doctor Snow said: "We took turns at cooking, but I did the baking—that was my job every morning. I baked more than 1500 muffins, and the boys said they were good, too," and the scientist smiled with boyish satisfaction.

But let no one think that the scientific expeditions led by Doctor Snow were mere holidays spent in fun and frolic, and to have a good time. On the contrary, they were often dangerous and full of hazard. They were sometimes in the midst of perils, seen and unseen—snakes, wild animals, Gila monsters and savage Indians, waterspouts and storms. On one occasion, the doctor had caught a small rattlesnake which he was attempting to put into a bottle of alcohol. As it was going in tail foremost, it suddenly stiffened itself and bit one of his fingers. He did not lose his presence of mind for a moment. Nevertheless the snake was bottled, and the doctor began a vigorous sucking of the bitten finger, had a string wrapped tightly above the wound, and continued the sucking process until the finger looked like a piece of dead meat. No serious effects followed.

In the summer of 1881, with a party of three, one of whom was

FRANCIS HUNTINGTON SNOW.

his son William, twelve years of age, he went to Arizona. The Apache Indians were on the war-path, killing the whites, carrying off their provisions and clothing, and driving away their horses and cattle. Intense excitement existed at the University when the news came that the party were in imminent peril of their lives. The anxiety was not allayed until a letter from the doctor arrived. He wrote, August 17, as follows: "Last Saturday afternoon our camp was visited by two citizens of Socorro, who made the trip on horseback at the risk of their lives, to inform us that the reds had murdered two men that morning on the road between our camp and town. Two of them were Mexicans who were going in with a load of wood. The loaded wagon stood in the road as we came by yesterday, and the blood of the murdered men stained the ground — not yet dry. Three white men were killed a mile further on. One other escaped to tell the news — the very man who took us out to the mountains on the preceding Monday. We were on guard day and night for three days — the rifle I bought in Boston coming into requisition for another purpose than for hunting venison and smaller game. We had pickets out by night and scouts by day. The Indians, night before last, came up the canon to within a few rods of our picket-guard, as we knew by the prints of their moccasins on the freshly wet earth. They were also watching us on Sunday from the top of the canon, about 1500 feet above us."

In 1906 Doctor Snow captured in Arizona a specimen of the lizard kind known as the Gila monster. It is asserted by some that the bite of this hideous looking animal is sure death; others declare it to be perfectly innocuous. His experience is that "the effects of a Gila monster bite have been much exaggerated." "Of course," said he, "I have not had so much to do with them. The one that I have planted six teeth securely in my thumb, and I suffered no ill effects."

Many other incidents might be related, but the foregoing are enough.

At the University Doctor Snow's time was taken up in the work of the recitation room, in delivering lectures, in correspondence with men of science in both Europe and America, and in arranging and classifying the thousands of insects, beetles and butterflies that he had collected. On many of his expeditions he made rare finds — some that were entirely new to science, and some to which by common consent his name was attached.

When Doctor Snow entered upon his administrative duties as the head of the Kansas University he was fifty years old. Robust, and strong in mind and body, he cheerfully but hesitatingly undertook the task of building upon the foundation already laid a great institution of learning. He was a firm believer in the co-education of the sexes. In that he never wavered. At the beginning of his administration as chancellor, the University was divided into schools—the College of Liberal Arts and Sciences, the Engineering School, the School of Law, the Graduate School, and three or four others. The board of regents placed at the head of each school a dean, with certain duties and reponsibilities. The head professors were allowed the largest latitude in the management of their respective departments. A very marked improvement along all lines was noticeable. The state legislature increased its appropriations, new buildings were erected, new members of the faculty were called to assist in the ever increasing labor, and more students swarmed through its halls.

The man at the head was instant in season and out of season. With him it was the University first, last, and all the time, and the University received the best that he had to give. Those who were closest to him were astonished at the marvelous capacity of the man. Lines of care soon began to make their appearance upon that young face. Weariness settled down upon that vigorous frame, and, to add to the burdens, his oldest son, William Appleton Snow, was drowned in the Bay of San Francisco, in the discharge of his duty as a newspaper reporter, at the time of the return of the Twentieth Kansas regiment from the Philippine Islands. It was a stunning blow, from which the doctor never fully recovered. Worn out and broken in health he went to Europe for a year to recover if possible his old-time vigor. On his return he resumed his duties as chancellor, apparently as strong as ever in both body and mind, but, finding the work heavier than he had anticipated, he resigned in 1901. The board of regents, however, reelected him to his former chair in the University. He at once resumed his duties among the butterflies, moths and beetles, and making his reports of Kansas weather. He enjoyed it. Frequently he was heard to say, "How happy I am, now that I am relieved of the chancellorship, and can do the work that I love best." He still looked forward to many days of usefulness; his eye seemed to be as keen as that of an eagle, his mind as bright and clear as ever, and his intercourse with his family and friends as free as in the days of old. But the burdens, the anxieties, and the cares of a busy life could no longer be cast aside. He was compelled to desist from his labors. He went North and East, only to meet everywhere an enemy that would not down at his bidding. It was a terrific struggle. On the 21st of September, 1908, the end came, and a great soul went across "the bar." His wife, Mrs. Jane Appleton Snow, to whom he was married in 1868, one son and three daughters survive him.

Doctor Snow was one of the seventeen men who organized the Kansas Academy of Science, in 1868, and he continued to be an active member all his life. He published in the Transactions of the Kansas Academy over 100 scientific articles. He wrote for other scientific journals and magazines, among them the American Naturalist, Science, Transactions of the Kansas Historical Society, Kansas Educational Journal, Bulletin Nuttali Ornithological Club, and Kansas Science Bulletin.

The trend of Doctor Snow's mind and tastes was along the lines of natural science. Nature was to him an open book, which he read with ever-increasing interest. He was a crowned prince in the realm of nature.

Doctor Snow was a member of many scientific societies. He corresponded with men of science in other lands, and was recognized as a scientist of high rank. His praise was upon the lips of men everywhere. Only a little while ago, a widely celebrated man remarked of Doctor Snow: "What a grand, glorious, wonderful man he is." Snow Hall was named in his honor. The Spooner Library building was erected out of funds left to the University by his uncle, W. B. Spooner, of Boston. The bequest was made because Doctor Snow was in the Kansas University. He saved to the state of Kansas hundreds of thousands of dollars by his discovery of the chinch-bug fungus. The collections that he made from year to year, now in the museum of natural history, have a monetary value of not less than a hundred thousand dollars. Truly, the state of Kansas is a debtor to this her first scientist.

Dr. Snow lived a blameless life, at peace with all mankind, happy in his family relations, a true Christian—loving God and loving man. He was an earnest, zealous student, a profound scholar, a seeker after truth in the laboratory, in the fields and in the air. In his official character as professor or as chancellor he was a fair and square man, and no respecter of persons. He loved his country and was willing to die for her. He loved Kansas, to which he gave all that he had.

He was more largely instrumental than any other man in the upbuilding of the University of Kansas. For forty-two years he watched over its growth and in many ways directed its progress.

He more than any other gave to the University the lofty position it now holds in the advancement and dissemination of science. As a matter of fact, Doctor Snow had caught the modern scientific spirit on the wing. He impressed it upon all who came under his instruction. Early in his undergraduate course at Williams College he felt its power. Later on, when he was with Agassiz at his marine laboratory, it became more fully developed. Finally, in the University, and on the western plains and mountains, he was under its complete control. It was the passion of his life. No one will question the assertion that at the time of his death Doctor Francis Huntington Snow was the first citizen of Kansas, and as such his name and fame will be more enduring than a monument of brass or marble.

THE SCIENTIFIC PAPERS OF DR. FRANCIS HUNTINGTON SNOW.

By F. O. Marvin, Lawrence.

The following bibliography of the scientific writings of Doctor Snow has been based largely upon a list that he himself prepared some years ago. It has been added to and brought down to include his latest work, all the material that could be found being gathered. In the summary given no account is made of the monthly reports of weather conditions at Lawrence, which reports have regularly appeared in sundry papers of the state. The annual reports were counted. The mere statistics of these weather observations show nothing of the faithful and constant daily care of making them. It was a personal matter with Doctor Snow, looked after by himself, some member of his family, or by some one under his immediate supervision. It is this personal element that makes this long series, extending over forty years, an accurate and therefore a very valuable record.

No mention is made in the bibliography of "The Observer of Nature." This was a small periodical, devoted to natural science, edited by Doctor Snow, and published at the University, where it had a real influence in developing a genuine scientific spirit. It was started in the early '70's and was issued for several years.

Doctor Snow possessed a simple and direct style, expressing his thought with clearness and in good diction. His writing as well as his speech showed energy and enthusiasm. It could not be otherwise, for these were qualities that were ingrained in the very nature of the man.

LIST OF SCIENTIFIC PAPERS.

1868 to 1908.

Complete series of monthly and annual meterological reports from 1868 to the present time, based upon personal observations for that period. The reports are published monthly in bulletin form, and republished in many state papers. Annual reports are published in the biennial reports of the State Board of Agriculture.

Also, 15 papers published in Trans. Kan. Acad. Sci., I to XII.

The Study of Plants. Kan. Ed. Jour., V, pp. 4-6.

1870.+

Natural Science a Necessity in our Public Schools. Kan. Ed. Jour., VII, pp. 144-151.

Catalogue of Plants Seen in Kansas by J. H. Carruth, with Dr. F. H. Snow and E. Hall. Trans. Kan. Acad. Sci., I.

1871.+

The Higher Education of Women. Kan. Ed. Jour., VIII, pp. 307-321.

The Birds of Kansas. Read at fourth meeting Kansas Academy of Science.

1872.+

Catalogue of the Birds of Kansas. Trans. Acad. Sci., I, pp. 375-386 (282 species enumerated); Kan. Ed. Jour., April, p. 8; Trans. Kan. St. Bd. Agri.

The Climate of Kansas. Trans. Kan. Acad. Sci., I, pp. 397-407; Trans. Kan. St. Bd. Agri.

The Claims of the Natural Sciences. Kan. Ed. Jour., pp. 253-263. Read at fourth meeting Kansas Academy of Science.

A Catalogue of the Birds of Kansas, second edition. Kansas City *Bulletin*, steam book and job printers and engravers; a pamphlet of 16 pages.

Additions to the Catalogue of the Birds of Kansas. Am. Nat., VI, pp. 484.

1874.+

Observations on the Use of the Antennæ of *Polyphylla variolosa* Harris. Trans. Kan. Acad. Sci., III, pp. 27, 28.

Additions to the Catalogue of Kansas Birds. Trans. Kan. Acad. Sci., III, pp. 30, 31 (9 species added).

1875.+

Third edition of Catalogue of Kansas Birds. An. Rep. Kan. St. Bd. Agri., IV, pp. 128-139 (295 species enumerated).

The Rocky Mountain Locust, *Caloptenus spretus* Uhler. Trans. Kan. Acad. Sci., IV, pp. 26-28.

The Fishes of the Kansas River at Lawrence. An. Rep. Kan. St. Bd. Agri., IV, pp. 139-141. Read at third meeting of State Natural History Society, 1870.

The Larva and Chrysalis of the Sage Sphinx, *Sphinx lugens* Walker, (*Eremitoides Streckerr*). Trans. Kan. Acad. Sci., IV, pp. 28, 29.

Catalogue of the *Lepidoptera* of Eastern Kansas. Trans. Kan. Acad. Sci., IV, pp. 29-59 (503 species enumerated).

The Best Means of Defense against the Insect Enemies of the Horticulturist. Trans. Kan. St. Hort. Soc., V, pp. 104-112.

1876.

List of Coleoptera Collected in Colorado in June, July and August by the Kansas University Scientific Expedition. Trans. Kan. Acad. Sci., V, pp. 15-20 (enumerates 304 species).

The Relation of Birds to Agriculture. Trans. Kan. St. Hort. Soc., VI, pp. 62-75.

1877.

Addition to the Catalogue of Kansas Birds. Trans. Kan. Acad. Sci., VI, p. 38 (enumerates 7 species and 2 varieties).

Amblychila cylindriformis Say. Trans. Kan. Acad. Sci., VI, pp. 29-32.

The Insects of Wallace County, Kansas. Trans. Kan. Acad. Sci., VI, pp. 61-71 (Coleoptera, 316 species; Lepidoptera, 45 species).

Hunting *Amblychila*. Am. Nat., XI, pp. 731-735.

List of Lepidoptera Collected in Colorado in June, July and August by the Kansas University Scientific Expedition of 1878. Trans. Kan. Acad. Sci., VI, pp. 70-75 (enumerates 104 species).

List of Coleoptera Collected near Dome Rock, Platte Cañon, Colorado, by the Kansas University Scientific Expedition for 1878. Trans. Kan. Acad. Sci., VI, pp. 75-76 (enumerates 94 species).

1878.

On the Dermal Covering of a Mosasauroid Reptile. Trans. Kan. Acad. Sci., VI, pp. 54-58; pl. I, Kan. City Rev. Sci.

1880.

The Climate of Kansas. Sec. Bien. Rep. Kan. St. Bd. Agri., VII, pp. 462-475.

List of Lepidoptera Collected near Idaho Springs, Colo., by the Kansas University Scientific Expedition for 1879. Trans. Kan. Acad. Sci., VII, pp. 61-63 (enumerates 180 species).

List of Coleoptera Collected in Santa Fe Cañon, New Mexico, by the Kansas University Scientific Expedition. Trans. Kan. Acad. Sci., VII, pp. 70-73 (enumerates 237 species).

Douglas County Additions to the List of Kansas Coleoptera in 1879-'80. Trans. Kan. Acad. Sci., VII, pp. 78, 79 (enumerates 144 species).

Preliminary List of the Hymenoptera of Kansas. Trans. Kan. Acad. Sci., VII, pp. 97-101 (enumerates 186 species).

Additions to the List of Kansas Lepidoptera. Trans. Kan. Acad. Sci., VII, pp. 102-105 (enumerates 140 species).

Larva of *Eurycreon rantalis* Quen (Web-worm). Psyche, III, p. 127.

1881.

List of Lepidoptera and Coleoptera Collected in New Mexico by the Kansas University Scientific Expedition. Trans. Kan. Acad. Sci., VIII, pp. 35-46 (315 species Lepidoptera, 53 sp. nov.; 514 Coleoptera, 17 sp. nov.)

1882.

Additions to the List of Kansas Coleoptera in 1881-'82. Trans. Kan. Acad. Sci., VIII, p. 58 (49 species).

On *Musca domestica* versus *Vespa occidentalis* Cresson. Psyche, III, p. 339.

1882.

A New Museum Pest, *Trogoderma tarsale*. Psyche, III, pp. 351, 352. June.

The Snake Bird in Kansas. Bull. Nuttall Ornithological Club, VII, p. 61.

1883.

Three Noxious Insects—the Forest Handmaid-moth, the Maple-worm, and the Codling-moth. Second Quart. Rep. Kan. St. Bd. Agri. pp. 93-101.

Hominivorous Habits of *Lucilia macellaria*, the Screw-worm. Psyche, IV, pp. 27-30.

Three Injurious Insects—the Tree-cricket, the Raspberry Saw-fly, and the Screw-worm. Mo. Rep. Kan. St. Bd. Agri. for May, pp. 6-12.

Injurious Insects and How to Destroy Them. First Quart. Rep. Kan. St. Bd. Agri., pp. 39-48.

1884.

Insects Injurious to Wheat. Fourth Bien. Rep. Kan. St. Bd. Agri., IX, pp. 604-611, pls. I, II.

Preparatory Stages of *Hyperchiria zephyria.* Grote. Trans. Kan. Acad. Sci., IX, pp. 61, 62.

List of Lepidotera and Coleoptera Collected in New Mexico by the Kansas University Scientific Expedition of 1883-'84. Trans. Kan. Acad. Sci., IX, pp. 65-69 (Lepidoptera 82, Coleoptera 148).

Paris Green, London Purple and Pyrethrum as Insecticides. Mo. Rep. Kan. St. Bd. Agri. for April, pp. 19-27.

Is the Rainfall of Kansas Increasing? Trans. Kan. Acad. Sci., IX, pp. 101-103.

1885.

On the Discovery of a Fossil Bird-track in the Dakota Sandstone. Trans. Kan. Acad. Sci., X, pp. 3-6, pl. I.

Injurious Insects from July to September—the Hessian Fly, the Wheat-straw Worm, the Corn-root Worm, the Strawberry-root Worm, and the Grape Phylloxera. Quart. Rep. Kan. St. Bd. Agri. for quarter ending December 31, pp. 152-157.

The Chinch-bug. Fifth Bien. Rep. Kan. St. Bd. Agri., X, pt. II, pp. 153-157.

Pear Blight. Rep. Kan. St. Bd. Agri. for quarter ending March 31, pp. 9-13.

Injurious Insects—the Hessian Fly, the Wheat-straw Worm, and the Web-worm. Mo. Rep. Kan. St. Bd. Agri. for June, pp. 5-18.

Is the Rainfall of Kansas Increasing? Science, January 2; pp. 12, 13.

1887.

The Purslane Worm, *Copidryas gloveri* Grote. Science, X, p. 158.

Loco-weed. Science, January 28, p. 92.

Is There a Venomous Lizard? Science, XI, p. 50.

Is the Rainfall Increasing on the Plains? Science, XI, p. 158.

Aechmophorus occidentalis in Kansas. Auk., V, p. 201.

1888.

On the Discovery and Significance of Stipules in Certain Dicotyledonous Leaves from the Dakota Rocks. Trans. Kan. Acad. Sci., XI, pp. 33-35.

The Logan County Nickel Mines. Trans. Kan. Acad. Sci., XI, pp. 39-42.

Three New Kansas Birds. Trans. Kan. Acad. Sci., XI, pp. 62-63.

A Comparison of the Records of the Two Anemometers at the University of Kansas. Trans. Kan. Acad. Sci., XI, pp. 107-109.

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The More Destructive Grasshoppers of Kansas. Bull. Dept. Entom., Oct., pp. 1-17, pls. I-IV (with S. J. Hunter).

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The Beginnings of the University of Kansas. Trans. Kan. St. Hist. Soc., VI, pp. 70-76.

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Notes on the Birds of Kansas, and a revised catalogue. Trans. Kan. Acad. Sci., XVIII.

1904.

Notes on Kansas Birds. Trans. Kan. Acad. Sci., XIX.

1905.

Notes on Kansas Birds. Trans. Kan. Acad. Sci., XIX.

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Some Results of the University of Kansas Entomological Expeditions to Arizona in 1904 and 1905. Trans. Kan. Acad. Sci., XX, pt. I.

1906.

Additions to the List of Kansas Birds. Trans. Kan. Acad. Sci., XX, pt. II.

Change in the Climate of Kansas. Trans. Kan. Acad. Sci., XX, pt. II.

Is the Gila Monster a Poisonous Reptile? Trans. Kan. Acad. Sci., XX, pt. II.

List of Species of Hymenoptera, collected in New Mexico, 1883-'84; Kansas Entomological Expeditions of 1902, 1903, 1904, 1905, 1906. These collections were made at several points in Arizona. Trans. Kan. Acad. Sci., XX, pt. II.

SUMMARY.

Meteorolgy.—A complete series of monthly and annual reports on the weather at Lawrence, from 1868 to 1908; 40 annual reports. Also, 24 papers.

Ornithology.—16 papers, of which 9 are lists of birds known in Kansas.

Entomology.—58 papers, of which 16 are lists of collections at various times and places, 11 relate to structure or habits, and 31 to the economic influence and importance of insects.

Fishes.—1 paper.
Reptiles.—4 papers.
Botany.—4 papers.
Meteorites.—4 papers.
General Science.—3 papers.
Education.—7 papers.
A total of 161 papers; 63 papers before the Kansas Academy of Science.

PROFESSOR SNOW AS A TEACHER.

By W. C. STEVENS, Lawrence.

We can best understand Professor Snow as a teacher by calling to mind the conditions under which his reputation in this field was made. This was before he was called to the chancellorship in 1890, when the daily sessions extended from nine o'clock till one, leaving the rest of the day to be used as the teacher chose. He elected to return after dinner and work in his museum until supper time. Again, we must recall how many branches of study he undertook to teach. They were zoölogy, botany, geology, physiology, meteorology, and comparative anatomy. It is clear enough that building up the museum as he did, and carrying on these numerous branches of science in the classroom, his reputation could not be achieved by profound scholarship in any one of them. Nevertheless, it is very clear to any one who was familiar with the inside of the University in what we now call the old days, that Professor Snow had a reputation as a teacher second to none, and he was considered our big man amongst the students and abroad over the state.

Let us hark back, and in memory enter his classrooms and see him at work there. We see his room filled with students. We see him enter with sprightly step and smiling face. A friendly feeling between teacher and students pervades the room. The roll is called, the text-book is opened on the teacher's desk, and the recitation begins. Questions on the day's lessons are asked clearly and forcibly; the ineffective answer is passed over without reproach, and the successful one is rewarded with a smile. Thus the hour of friendship and good will is passed, and the students feel a surprising amount of interest in the subject, considering the character of the text-books then in vogue; for it must be admitted that they were about as barren and dry-as-dust as such things well could be. They were the dry skeletons of science swinging and creaking in the wind; but in the classroom the rare personality of the teacher draped them about until they became comely, and, for the moment, fair to behold. About half of the time in elementary zoölogy and botany was spent in the laboratory, where enough gross anatomy was looked into to enable the students to find the scientific names by means of Gray's Manual and Jordan's Manual of the Vertebrates.

It was, of course, a physical impossibility, with classes as large as Professor Snow had, for him to spend much time with any one student, and the renowned method of Agassiz had to prevail. A single class filled the south and west rooms now occupied by the Greek museum, and although one of these rooms lacked the teacher's presence for half of the time order and diligent work prevailed. Once, the writer remembers, the boys barricaded the door between the two rooms with a movable blackboard and proceeded to indulge in horse-play. The teacher forced his way in and stood at the entrance laughing. The boys applauded and settled back into good order without a word of remonstrance or reproach from the teacher, and nothing of the kind again occurred.

Extensive as was the ground covered by Professor Snow's teaching in the latter part of the '80's he broadened it still more, adding animal histology, plant histology, entomology and systematic botany; and this was at a time when he had but one assistant, whose time and interest were mainly devoted to the museum. One wonders at Professor Snow's courage in this. It must be remembered that throughout his own college course he had devoted himself to the classics and mathematics, and he had undertaken the work in science here without any technical preparation. The use of the microscope and the whole German scientific literature were sealed books to him; nevertheless he pushed eagerly into the then newest fields of his sciences, equipped his department with microscopes and gave instruction to large classes of students where he himself was in the first stages of learning. One phase of his character permitted him to do this without serious danger to himself or his students—his absolute frankness and honesty, which kept him from misleading where he was not sure of his ground.

Thoughts of this phase of his character call to mind his attitude towards evolution, which, when he espoused it, was a very unpopular cause. Without a college training in biology, nevertheless his clear and logical mind was able to perceive the soundness of Darwin's conclusions, even at a time when the great Agassiz was withholding his approval. And with conviction once attained Professor Snow never faltered in his fidelity to it. His annual lectures on evolution at the University were enthusiastic, clean-cut, and convincing to the unprejudiced mind.

A word must be said about his lectures before the students in the various courses. His course in physiology and hygiene was entirely a lecture course, and he occasionally lectured in the other courses. The lectures were clear, simple, and straightforward, and were delivered in a charming manner.

What was the secret of Professor Snow's success as a teacher? There was no secret about it. Clear as day it was due to his personality. He was friendly, he was kind, he was patient, he was honest, he was lucid and forceful in speech, he was enthusiastic; and above all and under all was his manliness and fearlessness. These characteristics won for him the respect, the admiration and the affection of the hundreds of students who came under his tutelage. In after-years we loved to recall, not so much that we had studied botany and zoölogy at the University, as that we had studied them under Professor Snow.

FRANCIS HUNTINGTON SNOW MEMORIAL.

By Prof. E. H. S. Bailey, Lawrence.

The professor and scientific investigator to whose name we do honor to-night was foremost in all the activities that have to do with scientific life at the State University. Doctor Snow was one of the six charter members of the Iota chapter of the society of the Sigma Xi, which was founded at the University in 1890. Four of the members, although more than eighteen years have elapsed, are still members of the University faculty. He frequently contributed papers for the edification of the society, especially on his favorite topics meteorology and entomology, as well as graphic descriptions of his scientific expeditions. Not long before his health began finally to fail he entertained the society at his home, and gave a very complete history of the chinch-bug investigation. Doctor Snow was for some time vice-president of the Sigma Xi, and, later, president for a term of two years.

Some of the older students will remember Doctor Snow better as a member of the original Science Club, which met on Friday evenings to discuss general scientific subjects. In looking over the files of the annual meetings for the presentation of original work done by the different departments, his name is found as a frequent contributor. His enthusiasm at the Science Club meetings was contagious, and the result is seen to-day in the biological students all over the country, who were first inspired to scientific research by his voice and example.

The students of the late '80's will not readily forget how Doctor

Snow entered into the spirit of the occasion at the Science Club "It." Here professorial dignity was for the time laid aside, and the members vied with each other in writing, and, sometimes, in acting vigorous burlesques of the formal scientific papers of the year.

The firm hand-grasp, the hearty greeting and the unselfish help that Doctor Snow gave in all scientific activities will always be missed in Lawrence.

By J. W. BEEDE, Bloomington, Ind.

To the minister and teacher is given the privilege of teaching by precept, but to the teaching investigator is given the rare privilege of teaching by example. It is this example that inspires the sincere and able student to a life of devotion to the discovery of new truths for the benefit of mankind. To Professor Snow more than to any other person we must look as the father of scientific research in Kansas and the West. In his death it suffers an irreparable loss.

By A. H. THOMPSON, Topeka.

I do not deem myself worthy to discuss the topic before us, but cannot refrain from adding my tribute to the memory of our dear friend, from the standpoint of the amateur and the layman. He was, in a special sense, the friend and helper of the amateur, and never tired of giving his time and attention to the uninformed seeker after the truth. I recall with pleasure his many visits to my house, when we would sit far into the small hours, discussing scientific topics, and especially the exciting and weighty questions of evolution and Darwinism, which were occupying the attention of the scientific world.

But it is of his charming and winsome personality that I wish most to speak. His was a most sweet and winning character, and that was a power with him everywhere. I can easily understand his success in the classroom, for he drew the students to him, as he did every one, and invested the dry facts of science with an interest that remained a blessed heritage with them ever afterwards. I well remember the dedication of Snow Hall, which I had the pleasure of attending. I remember how the students carried Professor Snow on their shoulders to the hall and back, and how he enjoyed it as much as any of the boys. Prof. F. D. Cope, the brilliant paleontologist of Philadelphia, gave the address, and we went to dine at Professor Snow's with him and spent a never-to-be-forgotten day.

The cause of science and of the Academy owes more to Professor Snow in the cause of making them popular with the people at large than can be realized. With Professor Mudge, who was also popular with the people, much more is due to him than can ever be estimated. Such as he it is that add to the pleasures and enthusiasms of life and make the world the better for having lived in it.

DOCTOR SNOW AS TEACHER.

By L. E. Sayre, Lawrence.

It would be impossible for me, in the time which I feel allowed to occupy, to express in detail the thoughts that come to me as one who has the privilege of referring to Doctor Snow as an instructor. I should be glad if time were allowed to recount the delightful experiences with him as a teacher, and to recount the many ways in which he was a help and inspiration in the work of my own special department. When the School of Pharmacy was organized, in 1885 he was one of the first to contribute to the development of the curriculum and materially to aid in the instruction, taking upon himself the work in botany in its various branches.

It is needless to say that the students coming in contact with such a man as Doctor Snow felt themselves always in the presence of one who could speak with authority, and thus add a power and impetus to the work which few men are so capable of giving.

My own experience with Doctor Snow as an instructor has been that of a pupil rather than as a colleague. Although associated with him in the latter capacity since my connection with the University, I never could regard him other than as a leader. As a teacher, his pupils could never feel a discouragement in the consciousness of their own ignorance, because Doctor Snow's belief was that this consciousness of the lack of knowledge, which he confessed himself to keenly feel, was a good sign of a true student.

There are those who are satisfied to be instructed by books alone. Doctor Snow's method was that of books supplemented by reason and experience. With him the earth, the woods and the wayside teemed with instruction and knowledge. He often expressed the thought that he loved nature because he thought it was so truthful, and never led the honest student astray. If you investigate nature it conceals nothing; if you do not interpret it rightly, it is charitable—is never reproachful. But nature is a faithful, patient master, ready to instruct, not with the harsh discipline of the tutor, but with the allurement which invites investigation and brings with it inspiration. So imperceptible is nature's teaching that one is unconscious of being taught. This was Doctor Snow's temper toward a scheme of instruction. My impressions of Doctor Snow, as a teacher can be expressed in no better way than to say briefly, teaching with him was a delightful task, and instruction from him was a delightful incentive and inspiration.

DOCTOR SNOW AS A COLLECTOR, AND HIS COLLECTIONS.

By PROF. L. L. DYCHE, Lawrence.

In the Quarter Centennial History of the University of Kansas, in an article entitled "Reminiscences," Prof. D. H. Robinson, who commenced work in the institution as a colleague of Doctor Snow, gives us the following interesting information:

"Our learned professor of natural history, who has now achieved more than a national reputation in his special line of work, came to the University with the expressed desire of teaching the Greek language and literature. To this end, more perhaps than any other, had tended all his previous training. A severe classical course in college, with special attention to Greek, and a three years' course in Andover Theological Seminary, with critical study of Greek and Hebrew, had given him especial fondness and capacity for linguistic studies.

"His knowledge of the natural sciences, on the other hand, was mostly negative—only the smattering that was then taught in the New England classical college—just enough to make the 'darkness visible.'

"He brought to the duties of his professorship, therefore, no special training in science, but only the natural endowments of a sound, vigorous mind, sharpened by classical studies, keen powers of observation, a passion for knowledge, untiring energy, and boundless capacity for hard work. Thus equipped, he was elected professor of mathematics and the natural sciences."

In this same article it is further stated that the first scientific excursion undertaken by Professor Snow was made on Friday afternoon, September 4, 1866. The entire faculty of the University (consisting of three persons, President Rice, Professors Robinson and Snow) went on horseback up the river to Cameron's Bluff to examine some petrified turtles (presumably geodes) that had been reported as seen in that locality.

It was while sitting by a camp-fire one evening in New Mexico that Professor Snow, speaking of his first interest in natural history work and his collections, told the writer that the first specimen he ever collected and saved was a snake. He put the snake in a jar of alcohol and placed it on the mantel. He said that his father, referring to it, facetiously called him a professor of one snake. He said further that a prairie-chicken hunt that he and Professor Robinson took in the fall of 1866, while waiting for the first term of the University to open, gave him his first ideas about collecting and studying birds.

The oldest specimen I have been able to find in the University natural history museum, collected by Doctor Snow himself, is a snow goose, taken in April, 1870. In 1871, 1872 and 1873 a considerable number of bird-skin specimens were collected by Doctor Snow and his student assistants. While he was a keen student of birds, he never saved but a few skins, and mounted no specimens with his own hands.

Among his earliest collections were insects. These, as well as other natural history specimens, were first collected to illustrate lectures in the classroom. As he taught classes in nearly every branch of natural history, he thus laid the foundation for the magnificent collections the University now possesses. As his work progressed he made many reports to this Academy, and its pages are full of lists of specimens (especially of insects) which he secured on his various expeditions. However, his first paper was on "The Fishes of Kansas River," and was read before the Academy September 6, 1870.

In 1871 he read his first paper on "The Birds of Kansas," and in September, 1873, he read his first paper on insects, entitled "The Lepidoptera of Kansas."

SCIENTIFIC EXPEDITIONS.

We will now give a brief account of the twenty-six scientific expeditions which Doctor Snow made during the forty-two years he was connected with the University. More or less complete records of fourteen of these expeditions have been published in the proceedings of this Society. They extended over parts of western Kansas, Colorado, southwestern Texas, New Mexico and Arizona. The chief object of these excursions was to make collections of insects, though he was interested in nearly every branch of natural history, and encouraged his assistants and students to collect birds, mammals, reptiles, fishes and plants, as well as specimens of rocks, minerals and fossils.

1. The first collecting trip that Doctor Snow made, outside of the vicinity of Lawrence and Douglas county, was in 1876, to Colorado Springs and Pike's Peak. Five members of the gradua-

ting class of that year organized a scientific expedition for "exploration in Colorado." Professor Snow was invited to accompany the expedition. During the first week of August the student members of the party returned home. Professor Snow, his wife and son Willie—then about eight years old—remained until September 1. (Kan. Acad. Sci., vol. V, p. 15.)

2. In 1877 Professor Snow conducted an expedition to Wallace county, Kansas. He spent three weeks in camp along the Smoky Hill river, about one mile from Fort Wallace. His assistants on that trip were Richard Foster and John M. Walker, students of the University. It was that year that the party collected about 1500 specimens of the then rare species of tiger-beetle, *Amblychyla cylindriformis.* In 1876, the year previous, these beetles were reported to have sold at from five to fifteen dollars for a single specimen. Doctor Snow's immense catch put the market price down to one dollar, and take your pay in other insect specimens at their listed values. (Kan. Acad. Sci., vol. VI, p. 61.)

3. In 1878 Professor Snow, and Prof. B. F. Mudge, of the department of geology at the Agricultural College, made an expedition to Gove county, Kansas, for the purpose of collecting fossils from the chalk-beds of that locality. Richard Foster and L. L. Dyche, students at the University, were assistants on that expedition. The expedition spent about a month in Gove county. It was on that trip that Professor Snow was bitten by a rattlesnake. After carrying the snake about camp for some time and convincing himself that it was harmless if treated kindly, one day, about noontime, he undertook to put the reptile in a jar of alcohol, tail first. He was holding the snake by the neck with not more than an inch of the reptile's head protruding beyond his thumb and finger. However, about the time the snake's tail struck the alcohol the reptile managed to twist its head enough to bite the professor on the finger. The writer immediately tied a piece of shoe-string, the most available string on hand, tightly around the finger, and lanced the bite with a pocket-knife. Another member of the party immediately began sucking the finger so as to remove the poison. Either the treatment was very effective or the snake, being a small one, had little poison in its glands, for the professor was not injured, and in less than two hours was out collecting as usual. (Kan. Ac. Sci, vol. VI, p. 75.)

4. During the month of August in the same year (1878), Professor Snow and the students who were with him in Gove county, Kansas, spent about two weeks at "Dome Rock," Platte cañon,

Colorado. This was a new locality, and Professor Snow treated it in his reports to the Academy as a separate expedition. The time was spent collecting insects. It was on this trip that a rock, twice as large as one's head, fell from a high crag and struck on a railroad rail and smashed itself to pieces, between the writer and Professor Snow, who were walking tandem only a few feet apart on the rail. (Kan. Ac. Sci., vol. VI, p. 75.)

5. In 1879 Professor Snow made another trip to Colorado and camped for six weeks near Idaho Springs. He had his family and two student assistants, Miss Annie Mozley and L. L. Dyche, with him on that trip. This expedition secured, among other things, a fine collection of lepidopterous insects, especially catocala moths. (Kan. Ac. Sci., Vol. VII, p. 61.)

6. In 1880 he conducted an expedition to Santa Fé cañon, New Mexico. Camp was located eight miles up the cañon from Santa Fé. The party was made up of the same individuals as in 1879. In four weeks' time 237 species and varieties of Coleoptera — many of them rare and some new to science — as well as many other insects, were secured. (Kan. Ac. Sci., vol. VII, p. 70.)

7. In 1881 Professor Snow conducted another expedition to New Mexico. The party was made up of Prof. H. H. S. Smith, of the department of physics, Doctor Snow's twelve-year-old son Willie, and L. L. Dyche. The party located its camp in the Magdalena mountains, twenty-five miles west of Socorro. After five days' collecting, a band of hostile Apaches passed near our camp and murdered a number of men who were driving freight-wagons over the very road we had traveled a few days before, between our camp and Socorro. The writer, who was out hunting deer that morning, heard the shooting off to the east in the direction of Socorro, but did not understand what it meant until later in the day, when the news was brought to our camp by a man who escaped from the wagons. He had a bullet-hole in the crown of his hat and had not discovered it until he reached our camp. After living in apprehension for our lives for three days, we returned to Socorro with a party of about a dozen miners and prospecters. Doctor Snow's party now spent about three weeks collecting in the neighborhood of Socorro, one day at Deming, and a week at the old city of Pecos, which concluded the expedition. (Kan. Ac. Sci., vol. VIII, p. 25.)

8. In 1882 nine weeks were spent near the Las Vegas Hot Springs, New Mexico. The party consisted of Professor Snow, his family, and three students of the University — W. W. Russ,

Miss Mary Dyche and L. L. Dyche. A general collection of insects and plants was made. (Kan. Ac. Sci., vol. VIII, p. 35.)

9. In 1883 he visited the same locality with his family and collected for two months in Gallinas cañon, near Las Vegas Hot Springs. His assistants were W. H. Brown, W. C. Stevens and L. L. Dyche, students of the University. (Kan. Ac. Sci., vol. IX, page 65.)

10. In 1884 he again visited New Mexico. This year the party was divided into two sections. Prof. Snow, W. C. Stevens, and his son, Willie, camped and collected on Walnut creek, near Silver City. The writer had charge of the second section of the party and was assisted by William Harvey Brown. We collected part of the summer at Harvey's ranch, on top of "Baldy" mountain, about twenty-five miles northwest of Las Vegas. We spent about six weeks of our time thirty to forty miles to the northwest of Harvey's ranch, on the head waters of the Pecos river. (Kan. Ac. Sci., vol. IX, p. 65.)

I find no report of expeditions made including the years from 1885 to 1903 in the proceedings of the Academy. During most of this time Doctor Snow was either experimenting with chinch bugs or was on duty as chancellor of the University and did not do much work on his collections. However he made trips during this period and did more or less collecting. He visited the following places:

11. In 1889, Estes Park, Colorado.
12. 1890, Bailey, Platte Cañon, Colorado.
13. 1891, Manitou Park, Colorado.
14. 1892, Estes Park, Colorado.
15. 1894, Magdalena mountains, New Mexico.
16. 1897, Estes Park, Colorado.
17. 1902, Hamilton and Morton counties, Kansas.
18. 1902, Oak Creek cañon and Humphrey's Peak, Arizona.
19. 1903, Clark county, Kansas.
20. 1903, Martinez or Congress Junction, and Williams Fork of Colorado river.

21. In 1904 Doctor Snow, with his regular assistant, Mr. E. F. Tucker, and Dr. C. F. Adams, spent three weeks at Galveston, Tex., making a general collection of insects. (Kan. Ac. Sci., vol. XX, part I, p. 136.)

22. In 1904 he also visited Oak Creek cañon, Coconino county, Arizona, being assisted by Prof. W. H. Johnson and two students

—Eugene Smyth and Judah Drisco. (Kan. Ac. Sci., vol. XX, part I, p. 155.)

23. In 1905 Doctor Snow spent a month at Brownsville, Tex., and was assisted by Mr. Tucker and an undergraduate student, and Mr. E. G. Corwine. (Kan. Ac. Sci., vol. XX, part I, p. 136.)

24. Later in the summer of 1905, Doctor Snow and three student assistants, Messrs. Eugene Smyth, Ebb Crumb and Rollin Perkins, spent five weeks at San Bernardino ranch, on Sycamore creek, Cochise county, Arizona. (Kan. Ac. Sci., vol. XX, part I, p. 155.)

25. In 1906 Doctor Snow, assisted by L. A. Adams, a former student and assistant in the department of systematic zoölogy at the University, S. E. Crumb, and Eugene Smyth, spent June and July in Pima county, Arizona, making a general collection of insects.

26. In 1907 Dr. Snow made his last collecting trip to the Santa Rita mountains, Arizona. He was assisted on this expedition by W. J. Baumgartner, W. R. B. Robertson, and Fred Farragher, of the department of zoölogy at the University, and Eugene Smyth, of Topeka.

THE COLLECTIONS.

The fine insect collections, known now, by recent act of the board of regents of the University, as "The Francis Huntington Snow Entomological Collections," were built up largely from the material secured on these expeditions. Duplicate specimens were exchanged not only with the leading collecting entomologists of the United States but with a number of European collectors.

After returning from the various expeditions, Doctor Snow would work over the new material collected in his laboratory. Specimens of all species and varieties not found in his cabinets he would carefully pack in insect-proof boxes and send to specialists for determination. Though he secured several hundred species new to science on his various expeditions, I do not know of his having described and named a single species—finding the specimens and adding them to his fast-growing collections seemed to satisfy his mind.

As a result of his life's labor, he built up for the University of Kansas one of the largest entomological collections in the United States, and the largest in any educational institution, so far as we know, in the line of Coleoptera and Lepidoptera, except those at Harvard College. Some idea of the size of these collections may be obtained from the number of species, varieties and specimens it contains. An inventory has just been completed by Mr. Charles

H. Withington, who now has charge of the collections. The specimens in the regular museum collections are all named and set on insect pins with data labels attached. They are arranged in cabinet cases according to the best systematic classifications, so that it is possible for an entomologist to find any specimen in the collections almost as soon as it is called for.

	Number of species and varieties in regular named collections.	Number of specimens in regular named collections.
North American Coleoptera................	8,089	35,052
" " Lepidoptera............. ..	3,736	12,208
" " Diptera*..................	2,244	6,741
" " Hymenoptera...............	1,304	3,912
" " Hemiptera..........	1,064	3,724
" " Orthoptera................	492	1,845
" " Neuroptera................	293	....
Totals.................................	17,222	63,482
Exotic Coleoptera.........................	2,600	8,450
" Lepidoptera.........................	981	1,716
Totals.................................	3,581	10,166
Grand totals in collection, including exotics..	20,803	73,648

*This includes the fine collection of flies donated to the University of Kansas by Dr. S. W. Williston, now of Chicago University.

As yet no careful inventory of the number of specimens in the duplicate collection has been made. However, it is safe to say that there are as many specimens in this duplicate list, ready for exchange, as in the regular permanent collections.